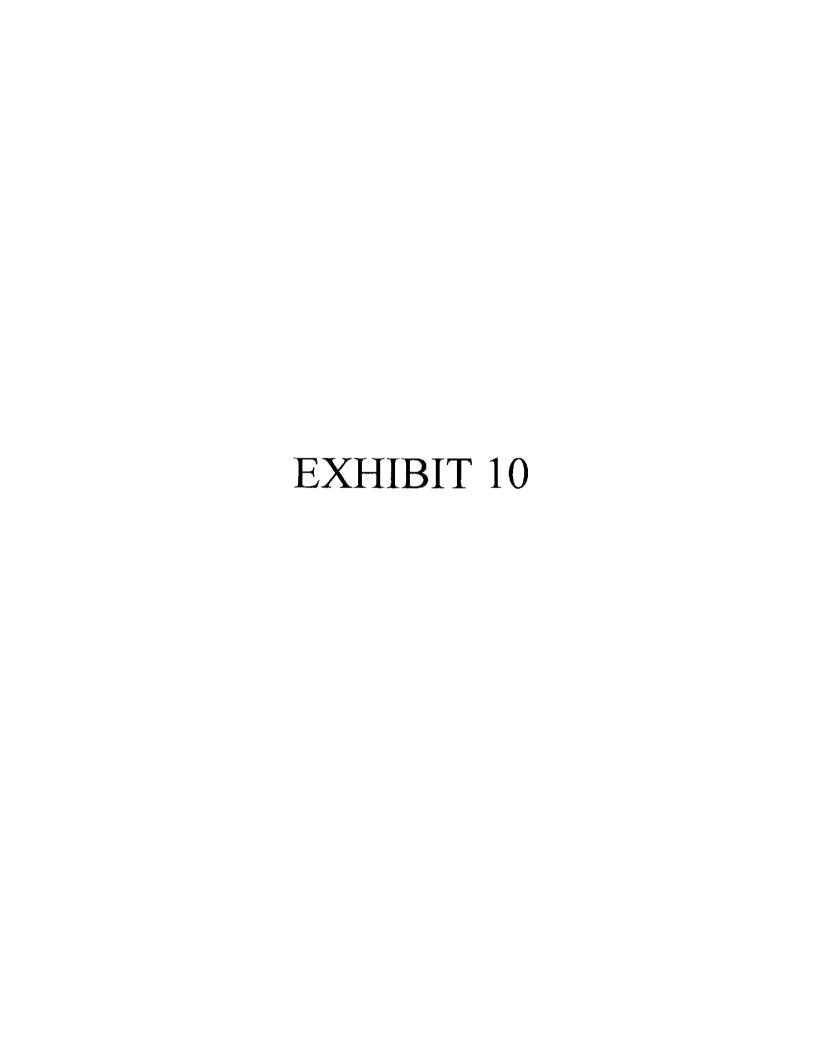
product requirements exceed the Comcast requirements; we would recommend an increase in this area to further decrease field failures.

**SCTE-40:** This test, with all impairments simultaneously at their worst case, is an excellent test of the full product's RF compliance. The range of impairments stresses the RF front end (diplexer, tuner, upstream amp) to ensure full operation across any plant condition; it is also performed over temperature (0°C to 50°C) to better simulate real-world environments, something not done by CableLabs for even basic DOCSIS functionality.

ESD – This is a real world issue in the home and ARRIS has adopted the Comcast requirements across all of our products (EN61000-4-2, Class 4).

Witness Testing: The P&E Requirements document is quite extensive and processes and procedures can be implemented in different ways. The Witness Testing is an important step in validating vendor compliancy.

HALT (Hardware Accelerated Life Testing): ARRIS has its own HALT system in our design facility and performs HALT (temperature and vibration) on every CPE product prior to final production release. The HALT effort takes a product to its breaking point, identifying the margin beyond the product specification. The process identifies production and unique design issues that can be addressed prior to product release, and results in improved product reliability and long term failure rates.





Charles Cusson
Director – Physical & Environmental Evaluations
Comcast
1002 Cornerstone Blvd.
Downingtown, PA 19335

December 2, 2010

## Charlie:

You asked whether Technicolor feels Comcast P&E compliance and testing requirements have strengthened the DOCSIS based products we sell to Comcast. We are confident that they have.

Some specific examples where the Comcast-mandated level of tolerance has helped product reliability:

Immunity to physical shock – immunity to impact while operating, such as a subscriber bumping the product (microphonics), and also tolerance of vibration and shocks typical during shipping.

Radiated immunity – resistance to upset caused by other RF devices operating with the home such as cell phones, RF remote controls, WiFi access points, and WiFi client devices.

ESD immunity – immunity to electrostatic discharge common when e.g. a subscriber touches a metal part of our product after shuffling across their carpet in low humidity conditions.

Power fault immunity- survival of power cycling caused by dropped cycles, brown-outs, power surges, and intermittent/sporadic power (as might occur during power faults).

Interface ports immunity – ability of product interfaces such as RF, Ethernet and USB to withstand high voltage surges common from e.g. lightning strikes near a home.

Thermal tolerance—ability to operate at temperatures significantly above normal home ambient, to accommodate the locations with poor air circulation where subscribers often place our products; also, detailed analysis of hot spots inside the product to verify component operating margins.

Cable plant impairments immunity – ability to continue to function even in the presence of worst case cable impairments including intermodulation distortion, thermal noise, hum and microreflections.

Technicolor believes that that these and other Comcast requirements have ultimately resulted in products that are more reliable, more robust, and thus less likely to fail. This benefits Comcast, its subscribers, and Technicolor.

It is Technicolor's judgment and belief that the testing is not onerous and does not create undue or unnecessary delay.

Sincerely,

Barbara Rosario Vice President

TECHNICOLOR USA 101 W. 103rd Street, Indianapolis, IN 46290 tel.: +1 317 587 4407 - email: barbara.roario@technicolor.com





let's make it

Maria Popo President - Americas

This document highlights the effect of Comcast Physical and Environment testing on Ubee Interactive DOCSIS-based modems.

Over the time period of Physical and Environmental testing, many items are uncovered which are not typically observed in ideal operating circumstances. The Physical and Environmental requirements push a product to the extreme to provide a characterized baseline of a product's capabilities.

Ubee Interactive has performed Physical and Environmental testing on a number of products and has observed increased quality of each product through the stringent requirements of Physical and Environmental testing. Listed below are a few areas where Ubee products have seen vast improvements based on the testing performed with Comcast. These items, along with other Comcast test requirements, have helped to improve product reliability and safety.

#### RF Immunity

The requirement for RF immunity is 5 V/M to 7 V/M. Initially, a Ubee product was only able to achieve 3 V/M. After extensive investigation and collaboration with the Comcast Physical and Environmental team, the product is now able to withstand levels of RF energy at or around 10 V/M. This results in the product's ability to withstand any type of outside RF interference observed in a worst case scenario (I.e. a Nextel Phone sitting on the device)

## Electrostatic Discharge

The Comcast Physical and Environmental ESD requirement attempts to replicate a real-world scenario of static electricity. In a home environment it has been found that static electricity will break a device and/or hinder the performance, hence requiring a device reset or a device replacement. The ESD requirements ensure that all extreme scenarios for a possible service interruption due to a user discharging static electricity are covered. Early revisions of Ubee products have observed issues with ESD and through further investigation and testing with Comcast our devices now withstand all ESD testing requirements with some changes to the product. The additional enhancement to the devices will greatly decrease the chances of a service call in the event of an ESD discharge.

## Impact and Drop Testing

Though sometimes difficult to justify 10 consecutive drops on a concrete floor, the Impact and Drop testing requirements ensure that a device can withstand impacts and drops at extreme situations. With sensitive electronic components, it is always difficult to ensure that the devices will be handled properly. The Comcast Physical and Environmental requirements for drop and impact testing have helped to verify that the Ubee products can now withstand more harsh environments. This was accomplished through improving our methods related to component mounting and case construction.



let's make it 6059

Maria Popo President - Americas

# **Extreme Temperature Testing**

Most devices are tested in ideal situations with temperature and humidity being nominal. The P&E Requirements push devices to operate at extreme temperatures to replicate a worst case scenario. These requirements have helped to improve thermal efficiency for Ubee products through the efforts of heat mitigation and proper air-flow. This has greatly improved the longevity of Ubee DOCSIS devices and will help prevent any possible dangerous situations that may occur due to excessive heat.

The objective of performing these tests and thus improving the robustness of our modems is to provide a better consumer experience through consistently reliable products.

Maria Popo

President Americas Ubee Interactive, Inc. 8085 S. Chester Englewood, CO 80112 303-539-8210 Office 303-521-5588 Cell



From: Hume Vance [humev@zoom.net]
Sent: Tuesday, August 31, 2010 4:11 PM

To: Zapar, Will; Zedan, Nathan; Iveson, Earle; Griffiths, Chris

Subject: Help in re LED behavior

Hi Chris, Earle, Will and Nathan,

Our D2 CM will go end of life next year and we are looking at a new model to replace it. This would be a retail product, like our other CMs.

The model we are looking at has LEDs that do not conform to the recommendations in the CableLabs document CM-SP-OSSIv2.0-C01-081104.pdf, section 10.1. In particular, there is no LED activity to indicate DS synch, ranging, and registration.

Here is the LED description:

	Default Software LED Behavior
'C	No CPE connected – The LED is OFF.  CPE connected – The LED is ON to indicate a data link is established. The LED will blink whenever data is being tran between a CPE and the modem.
able	When the CM is registered, the LED is ON and will remain illuminated continuously; otherwise the LED is OFF,
end	The LED will blink whenever data is being transmitted by the modem; otherwise the LED is OFF
leceive	The LED will blink whenever data is being received by the modem; otherwise the LED is OFF
'ower	Whenever the CM is powered on, the LED is ON and will remain illuminated continuously.

These LEDs could easily be relabeled LINK ONLINE US DS & POWER. However, note that they are in the opposite order of the preferred CableLabs orientation.

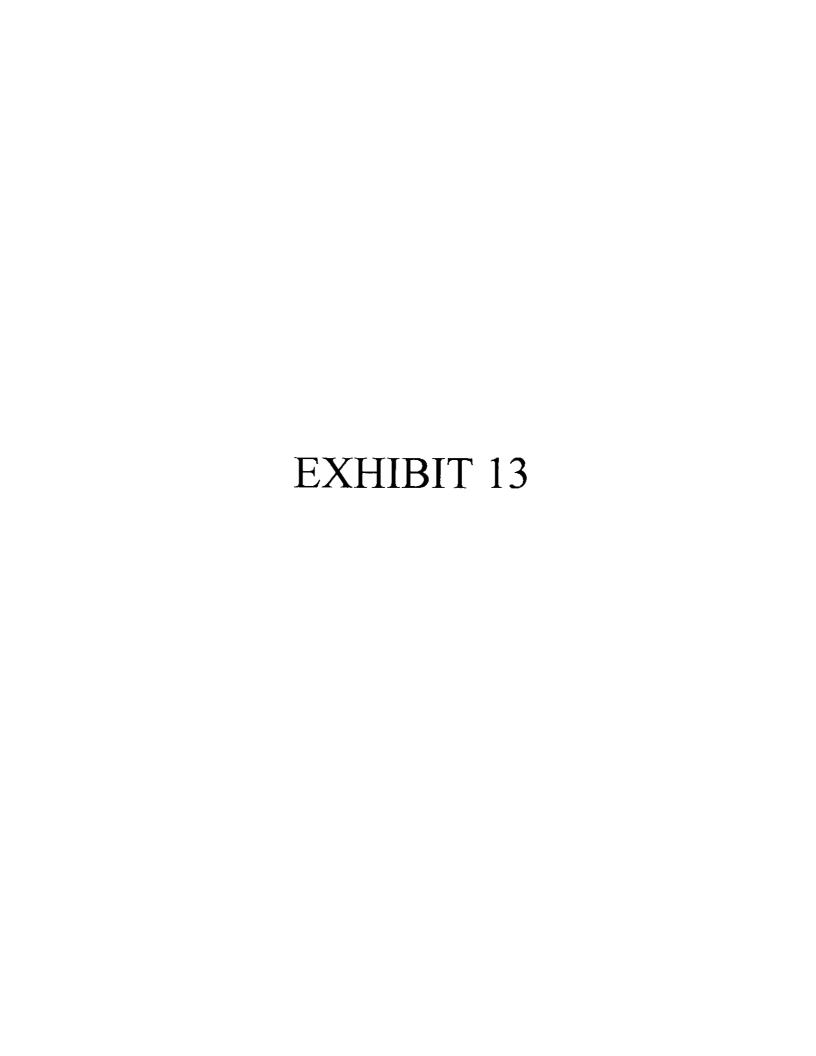
Does Comcast have a requirement for LED designation and behavior that you could share? Would Comcast be able to approve a CM with the above behavior?

I appreciate your help in this.

Thanks and regards,

Hume

Hume Vance Director, Firmware Engineering Zoom Telephonics, Inc. 207 South Street Boston, MA 02111 USA humev@zoom.com +1 617 753-0032







October 6, 2010

Via UPS Next Day Air
Tracking # 1Z F11 E45 01 9090 1209

Mr. Frank Manning President & CEO Zoom Telephonics 207 South Street Boston, MA 02111

E-mail: frankm@zoom.com

Re: Your Letter dated September 13, 2010

Dear Frank:

I am in receipt of your letter dated September 13, 2010, in which you express your view that Comcast is required to certify Zoom's new DOCSIS 2.0 modems, notwithstanding that Comcast ceased its review and certification of DOCSIS 2.0 devices approximately one year ago. As you have acknowledged, Comcast previously has certified both a DOCSIS 2.0 and a DOCSIS 3.0 modem for Zoom. My understanding is that Zoom has identified an alternative integrated circuit that it desires to use in the manufacture of the previously approved DOCSIS 2.0 modem, and that it is considering development of an entirely new model DOCSIS 2.0 modem with wireless-N for retail.

Over the past few years Comcast has transitioned virtually all of its networks to a DOCSIS 3.0 platform. In conjunction with that transition, Comcast has begun offering higher Internet speed tiers, and has increased the speeds it offers through its existing tiers. In addition, as you may be aware, Comcast markets and provides its customers with Powerboost®-- a patented technology that permits customers to achieve download and upload speeds in excess of their modem's provisioned speeds under certain circumstances. Comcast anticipates that over time additional increases in download speeds will be driven by the competitive marketplace.

DOCSIS 2.0 modems are not capable of reaching the higher speed tiers that Comcast has begun to offer and that increasingly will become the norm in the marketplace. Moreover, as Comcast increases the speeds available in its existing tiers, its customers who own or lease

Mr. Frank Manning, President & CEO Zoom Telephonics October 6, 2010 Page Two

DOCSIS 2.0 modems may require device replacements in order to enjoy the full benefit and extent of their services. While Comcast has not yet designated DOCSIS 2.0 modems as "End of Life," it has scaled back its purchases of those modems significantly and increasingly deploys DOCSIS 3.0 modems to its customers. For these and other reasons Comcast has not certified new DOCSIS 2.0 modems or EMTAs for close to a year.

Contrary to what you suggested in our conversation and in your letter to me, Comcast is under no obligation to certify Zoom's or any other vendor's high speed Internet devices for use with Comcast's broadband Internet network. The provision you cited from the Telecommunications Act of 1996 clearly and solely applies to converter boxes and other equipment used to access multichannel video programming and services. That provision never has been applied to cable modern devices or services. Notwithstanding as much, Comcast has demonstrated an interest and willingness to review and certify cable modem devices from a variety of vendors for use on its network - indeed Comcast previously has certified devices from Zoom which have been authorized on Comcast's network. However, Comcast is not obligated to accept any particular devices for certification simply because a vendor determines that doing so would be in that vendor's financial interest. Consumers who wish to purchase DOCSIS 2.0 modems have a number of alternatives available to them that previously have cleared Comcast's certification process, including Zoom's existing model. The proposed principles you set forth in your letter are intended to achieve your goal of having Zoom's devices reviewed through Comcast's certification process while denying Comcast any discretion as to the management of that process or the ability to promote the use of more advanced devices on its network.

Notwithstanding these concerns, Comcast is willing to evaluate Zoom's modification to its previously approved DOCSIS 2.0 device only. We are currently evaluating the impact of such an exception to our existing device testing process and policies, and are reviewing resources required to accommodate your request. While I am not in a position to advise you regarding specific scheduling, a representative from Comcast will contact you with additional information in the next few weeks.

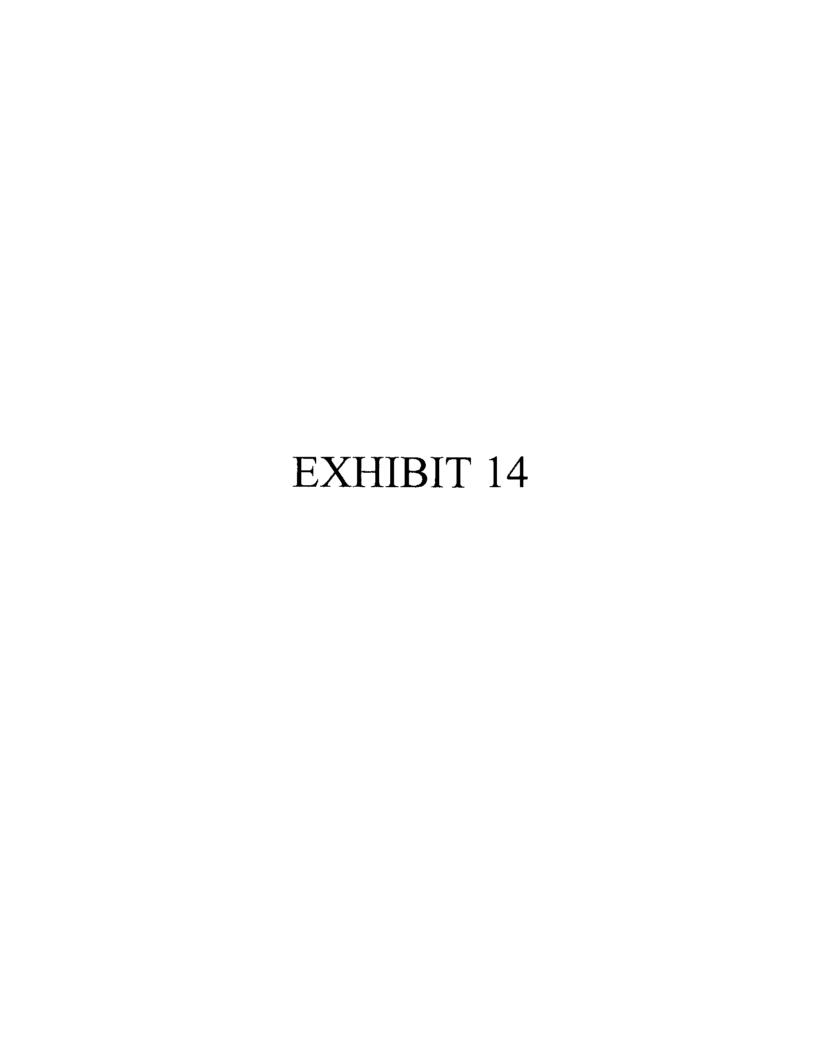
Sincerely,

Jeffrey E. Smith

Vice President & Deputy General Counsel

JES/srp

cc: Jason Livingood (via e-mail)



Baker, Norman [Norman Baker@cable.comcast.com] From: Tuesday, October 12, 2010 5:49 PM Sent: Hume Vance; Frank Manning To: Peart, Richard; Cusson, Charles; Iveson, Earle Cc: RE: Your October 6 letter to Zoom Subject: Hume, As long as the CL was completed before your execution of the test plans starts, or you did not change the device after you started to execute the test plans to be able to pass the CL cert, that should be OK. Norm Baker NE&TO Product Engineering - Quality Assurance Comcast Cable Communications, Inc. 1002 Cornerstone Blvd. Downingtown, PA 19335 484-364-4138 (work) 484-354-9447 (cell) Norman\_Baker@cable.comcast.com ----Original Message----From: Hume Vance [mailto:humev@zoom.net] Sent: Tuesday, October 12, 2010 5:01 PM To: Baker, Norman; Frank Manning Cc: Peart, Richard; Cusson, Charles; Iveson, Earle Subject: RE: Your October 6 letter to Zoom Norm, If our data was ready before the CL certification announcement, does that mean you would wait until the CL announcement and then buffer in the 3 weeks to review the data, or would the review start when you had all the data you need? Thanks, Hume ----Original Message-----From: Baker, Norman [mailto:Norman\_Baker@cable.comcast.com]

As I said, give a target date for all the pretest data being completed as a single package and locations where

Sent: Tuesday, October 12, 2010 3:26 PM

Cc: Peart, Richard; Cusson, Charles; Iveson, Earle Subject: RE: Your October 6 letter to Zoom

To: Hume Vance; Frank Manning

the onsite will be and we will look at our schedule. We will buffer in at least 3 weeks from your date to the date of onsite test for data review.

Norm Baker
NE&TO Product Engineering - Quality Assurance
Comcast Cable Communications, Inc.
1002 Cornerstone Blvd.
Downingtown, PA 19335
484-364-4138 (work)
484-354-9447 (cell)
Norman\_Baker@cable.comcast.com

----Original Message-----

From: Hume Vance [mailto:humev@zoom.net] Sent: Tuesday, October 12, 2010 2:55 PM

To: Baker, Norman; Frank Manning

Cc: Peart, Richard; Cusson, Charles; Iveson, Earle Subject: RE: Your October 6 letter to Zoom

Thanks, Norm.

Do you have waves for your P&E and SCTE40 testing, or can testing start up whenever all the pre-requisites are in place?

Related to that, how much lead time do you need to start a test cycle? Does this vary, and if so by how much?

For reference, we anticipate receiving CableLabs certification sometime in January. CL D2 certifications are now done on a rolling basis, so we won't know for certain what the date will be until we receive the result.

Regards,

Hume

----Original Message-----

From: Baker, Norman [mailto:Norman Baker@cable.comcast.com]

Sent: Tuesday, October 12, 2010 2:00 PM

To: Hume Vance; Frank Manning

Cc: Peart, Richard; Cusson, Charles; Iveson, Earle Subject: RE: Your October 6 letter to Zoom

Hume,

Answers below.

Norm

Norm Baker

NE&TO Product Engineering - Quality Assurance Comcast Cable Communications, Inc. 1002 Cornerstone Blvd. Downingtown, PA 19335 484-364-4138 (work) 484-354-9447 (cell) Norman\_Baker@cable.comcast.com

----Original Message-----

From: Hume Vance [mailto:humev@zoom.net] Sent: Tuesday, October 12, 2010 1:42 PM

To: Baker, Norman; Frank Manning

Cc: Peart, Richard

Subject: RE: Your October 6 letter to Zoom

Hi Norm,

Could you remind me what the schedule parameters are for your testing?

1.) Do you require CL certification before your Physical & Environmental and SCTE40 testing can proceed?

FCC, UL and CL certs should be completed as these may cause you to change the hardware.

2.) Are there any other pre-requisites before you can start testing?

We need your pretest data at least 3 weeks before we go onsite for product verification - this gives us time to review it, while working other projects, to see if it is ready for us to come onsite.

3.) Once we provide the pre-test data and any other prerequisites, how long does it take to complete your testing? Does this proceed in parallel with the DOCSIS and functional testing that takes place in Earle's labs?

We typically schedule a week onsite for P&E and if the P&E goes well another week onsite for SCTE40. After the second week / SCTE40 we will have an issues list written within 2 weeks which we need your response to within one week as to how you are going to mitigate the issues / defects we found retesting may be required. If all goes well Charlie will send out a conditional approval or approval after the issues are resolved. Ideally our test cycle should be first as it may cause you to change your hardware requiring any testing to date to have to be redone.

### Norm

----Original Message-----

From: Baker, Norman [mailto:Norman Baker@cable.comcast.com]

Sent: Tuesday, October 12, 2010 9:55 AM

To: Frank Manning; Hume Vance

Cc: Peart, Richard

Subject: FW: Your October 6 letter to Zoom

Hello Zoom folks,

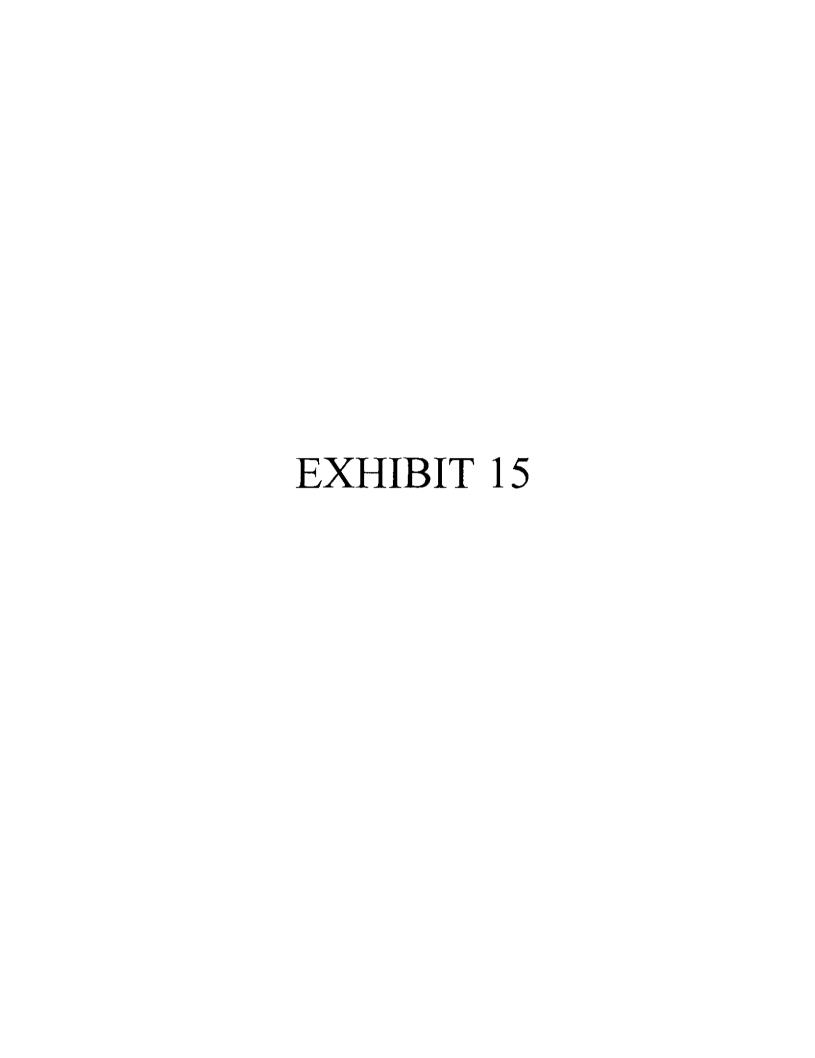
Thanks,

Attached is our Comcast Physical & Environmental (P&E) test documents and process, of which Hume is familiar. Jason Livingood has requested we engage you for a D2.0 device referenced below. Please send us some spec sheets on the device. Also, please give us a target date for the P&E and SCTE40 pretest data (as a complete package, not in pieces with different dates) and locations where the P&E and SCTE40 onsite product verification will take place and we will go from there.

```
Norm Baker
Norm Baker
NE&TO Product Engineering - Quality Assurance
Comcast Cable Communications, Inc.
1002 Cornerstone Blvd.
Downingtown, PA 19335
484-364-4138 (work)
484-354-9447 (cell)
Norman_Baker@cable.comcast.com
>
>
>
>
>On 10/7/10 2:43 PM, "Frank Manning" <frankm@zoom.net> wrote:
>>Jeff, thank you for that clarification. We will go forward with that
one
>>DOCSIS 2.0 cable modem product right away. That device has a Broadcom
>>chipset and accompanying electronics, and is in new and appropriate
>>plastics.
>>
>>Thank you for your cooperation and Comcast's. We appreciate it.
>>
>>Regards..Frank
>>
>>----Original Message-----
>>From: Smith, Jeff [CORP] [mailto:Jeff_E_Smith@Comcast.com]
>>Sent: Thursday, October 07, 2010 2:36 PM
>>To: Frank Manning
>>Cc: Livingood, Jason; Hume Vance
>>Subject: RE: Your October 6 letter to Zoom
>>Regardless of model numbers, we are agreeing to proceed only with the
>>device for which you are changing the current chipset (and
```

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accompanying
>>electronics). One device.
>>-----Original Message-----
>>From: Frank Manning [mailto:frankm@zoom.net]
>>Sent: Thursday, October 07, 2010 12:35 PM
>>To: Smith, Jeff [CORP]
>>Cc: Livingood, Jason; Hume Vance
>>Subject: RE: Your October 6 letter to Zoom
>>
>>Jeff, my confusion relates to your terms "modification" in you October
>>letter and "existing model" in the email below. I had already
mentioned
>>that this was a change of chipset and that we'd need to do a new
>>CableLabs submission. We're trying to deal with the obsolescence of
>>chipset, and that issue has driven a change to a new unit with a
>>Broadcom chipset. What is the issue for Comcast? If the issue is the
>>model number, please let me know and we will consider using the same
>>model number. We want to work with you, and I'm uncertain about what
you
>>want.
>>Regards,
>>Frank
>>P.S. A change in the primary cable modem chipset always requires a
>>change in the electronics, I assumed that Comcast knew that.
>>----Original Message-----
>>From: Smith, Jeff [CORP] [mailto:Jeff E Smith@Comcast.com]
>>Sent: Thursday, October 07, 2010 12:02 PM
>>To: Frank Manning
>>Cc: Livingood, Jason; Hume Vance
>>Subject: RE: Your October 6 letter to Zoom
>>I was only referring to your existing model for which you are
proposing
>>a change in chipset. We currently our reviewing our processes and
>>policies, and have made no decision with respect to any other devices.
>>
>>----Original Message-----
>>From: Frank Manning [mailto:frankm@zoom.net]
>>Sent: Thursday, October 07, 2010 11:50 AM
>>To: Smith, Jeff [CORP]
>>Cc: Livingood, Jason; Hume Vance
>>Subject: Your October 6 letter to Zoom
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>>Importance: High
>>
>>Dear Jeff.
>> Thank you for your letter of October 6, 2010 and the insights it
>>provides into Comcast's perspective and plans. I want to make sure
>>that I understand your statement: "Notwithstanding these concerns,
>>Comcast is willing to evaluate Zoom's modification of its previously
>>approved DOCSIS 2.0 device only." I am assuming that "modification of
>>its previously approved DOCSIS 2.0 device only"
refers
>>to the basic DOCSIS 2.0 cable modem we've discussed, the one that uses
>>Broadcom chipset instead of the Conexant chipset used in our currently
>>approved DOCSIS 2.0 model. The "Broadcom model" (our Model 5242) has
>>similar functionality to the "Conexant model" (our model 5241), but
>>different electronics and plastics, and Zoom needs to get CableLabs
>>certification for this new cable modem as previously mentioned. This
>>the cable modem that Comcast is willing to evaluate, right? I want to
>>make very sure about this, since it's so important to Zoom's plans.
>> If this works for you and Comcast, we will move guickly forward
>>with this product; and will not move forward with a DOCSIS 2.0 cable
>>modem with wireless capability. We hope to hear from you soon.
>> Thank you for your help with this.
>>
>>Regards,
>>Frank Manning
>
>
```



From: Livingood, Jason [jason\_livingood@cable.comcast.com]

Sent: Tuesday, October 12, 2010 1:33 PM

To: Hume Vance Cc: Frank Manning

Subject: Re: Question relative to Physical & Environmental Testing

Our testing/cert policies continue to evolve. We now believe it is important that all devices in the network, whether customer-purchased or Comcast-purchased should pass P&E evaluation.

Regards Jason

From: Hume Vance < humev@zoom.net > Date: Tue, 12 Oct 2010 12:30:30 -0500

To: Jason Livingood < jason livingood@cable.comcast.com >

Cc: Frank Manning < frankm@zoom.net >

Subject: Question relative to Physical & Environmental Testing

## Dear Jason,

We are very pleased that Comcast has agreed to accept for certification testing our new D2 CM to replace our Model 5241, which is going EOL next year. The new CM is the Model 5242. We thank you for this opportunity.

As you know, our CMs are retail models. While we would be more than happy to sell our CMs directly to Comcast, our initial plan with the Model 5242 is to sell this at retail only. Last spring, when we submitted our Model 5341 D3 CM, you waived the Physical and Environment testing requirements in view of the fact that this model was to be sold at retail only. We wish to remind you of that, and to ask whether the P&E tests can be waived for the same reason relative to the Model 5242.

For reference, we anticipate receiving CableLabs certification sometime in January.

Best regards,

#### Hume

Hume Vance
Director, Firmware Engineering
Zoom Telephonics, Inc.
207 South Street
Boston, MA 02111
USA
humev@zoomtel.com
+1 617 753-0032

# EXHIBIT 16

From: Iveson, Earle [Earle\_Iveson@Cable.Comcast.com]

Sent: Friday, October 29, 2010 1:07 PM

To: Hume Vance

Cc: Livingood, Jason; Griffiths, Chris

Subject: RE: Specifications for Comcast certification testing

#### Hume,

Attached is our DOCSIS requirements documents. I hesitate to give you a detailed list of test requirements as we do not want to solely focus on the items we can test for. As you can understand there are plenty of DOCSIS specs that we would not have the ability to test for in our lab environment and would hate for you to focus your efforts on just what we can test for. Obviously, we count heavily on you building a fully DOCSIS compliant device and not just something that will pass our limited test abilities..

Here is an outline of some of the items we test for;

Software Secure Download - SSD OSS Provisioning - PROV IP Performance - PERF RF Capability - RFCAP Stability - STAB Dynamic Channel Change - DCC IPv6

Thanks, Earle

From: Hume Vance [mailto:humev@zoom.net] Sent: Thursday, October 28, 2010 12:16 PM

To: Iveson, Earle

Cc: Livingood, Jason; Griffiths, Chris

Subject: Specifications for Comcast certification testing

Hi Earle,

Since Zoom is trying to plan regarding possible new cable modem submissions to Comcast, it would be very helpful if we could see the specification documents that you test against. We would like to know ahead of time what the complete set is of your requirements, to help assure that we not submit a cable modem that fails your requirements.

Our first interest is what the requirements are for a DOCSIS 2.0 CM. You may be aware that Jeff Smith agreed that Comcast would be willing to test a Zoom D2 model to replace our current model.

If there is separate documentation that covers D3 CMs, we would like to see that, as well, in

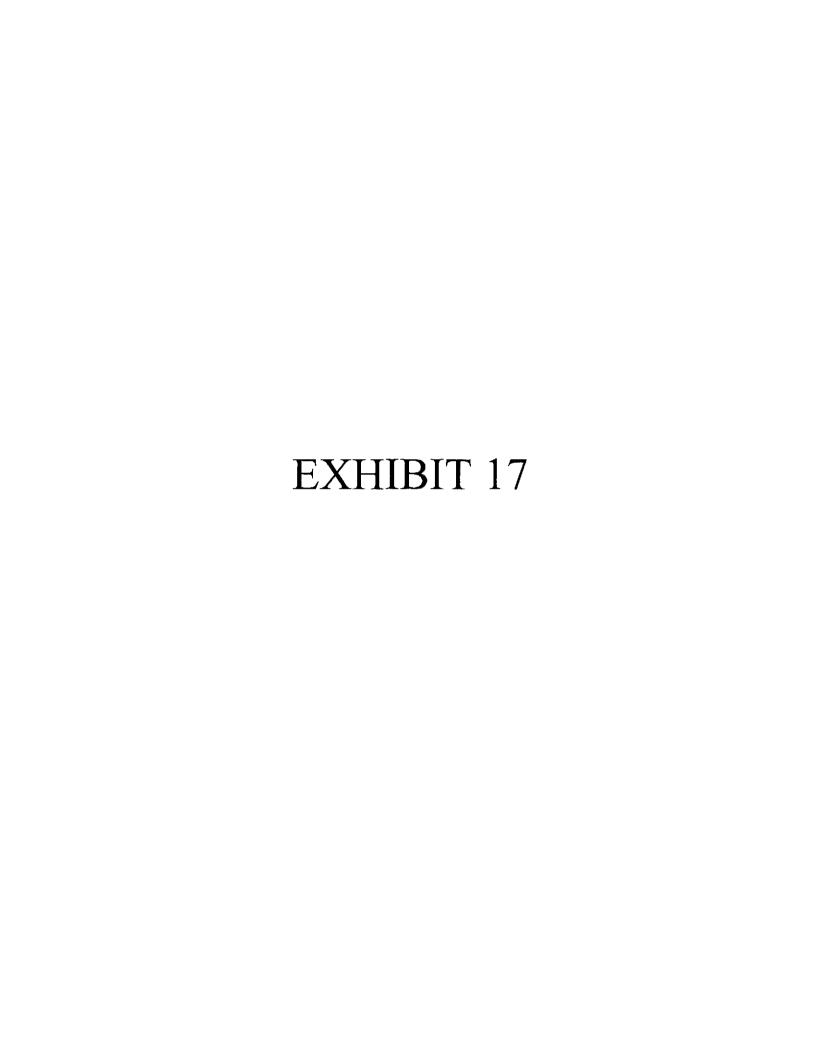
anticipation of further C3 submissions.

Regards,

Hume

Hume Vance
Director, Firmware Engineering
Zoom Telephonics, Inc.
207 South Street
Boston, MA 02111
USA
humev@zoomtel.com
+1 617 753-0032

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# CONFIDENTIAL - FOR SETTLEMENT PURPOSES ONLY

# Proposal of Zoom Telephonics, Inc.

- Comcast will henceforth certify all new Zoom cable modem models for use on its systems.
   Comcast may recognize that these models must still be approved by CableLabs, but is required to certify these models for use on its systems within two weeks of CableLabs approval. Comcast will neither require any additional testing for cable modems beyond that performed by CableLabs nor charge Zoom for certifying cable modems.
- Comcast will not ask CableLabs to perform any additional tests for DOCSIS 2.0 and 3.0 cable modems other than those that are currently performed.
- Comeast will not attempt in any way to disadvantage Zoom cable modems in the CableLabs test and certification process.
- Comeast will be proactive in making it clear that cable modems on the Comeast list of
  currently approved cable modems are welcome on the Comeast network. They will do this
  by: (1) having a statement to this effect on the Comeast website, publicly available and easily
  found by the public; and (2) having its training program for Comeast customer-facing
  personnel include training to this effect.